

Reply of January 16, 2004

Appl. No. 09/640,703

Response to Office Action of October 17, 2003

REMARKS

Entry of this amendment under 37 C.F.R. §1.116 is respectfully requested because it places the application in allowance or in better form for appeal. No new matter is believed to be added to the application by this amendment.

Status of the Application

The Examiner has withdrawn the rejections of record and withdrawn the finality of the Office Action of May 22, 2003.

Status of the Claims

Claims 1, 3-17, 19 and 21 are pending in the application.

Rejection Under 35 U.S.C. §103(a) Over Rudisill and Hiyama

Claims 1, 3-5, 7, 9-13, 19 and 21 are rejected under 35 U.S.C. §103(a) as being obvious over Rudisill (U. S. Patent 5,339,179) in view of Hiyama (U.S. Patent 6,104,454). Applicant traverses.

The Present Invention and its Advantages

The present invention pertains to a novel back light unit for a liquid crystal display that has a cone pattern formed on an upper surface of the light guide plate. As a result, only one light-path

converter and only one diffusion sheet are needed. Also, a reflection of the light-guide pattern and wall surface as well as the bright lines of the light input are minimized. In addition, different types of sheets can be used as the light-path converter to improve the light efficiency as well as to reduce the manufacturing cost.

As is typically embodied in instant claim 1, the invention sets forth:

1. A back light unit in a liquid crystal display including a lamp generating a light, and a light input having a lamp housing for housing the lamp and reflecting the light, said unit comprising:

a light-guide plate including a **cone pattern** to uniformly guide the light from the light input;

a light-path converter to control a progress direction of the light in such a manner that the light outputted from the light-guide plate is progressed in a direction perpendicular to a liquid crystal panel; and

a diffusion sheet for diffusing the light passing through the light-path converter into the liquid crystal panel,

wherein the cone pattern is formed on an upper surface of the light-guide plate, and a density of cones increases as a distance from said lamp increases. (Emphasis added)

Similar to claim 1, independent claim 11 sets forth "cones distributed in a pattern."

Distinctions of the Invention over Rudisill and Hiyama

Rudisill pertains to an edge-lit transflective non-emissive display. Rudisill's display includes a lamp 38 in a lamp housing 40. Figure 3 of Rudisill shows a backlight panel having a top surface 52 where "conical pits 56 are evenly distributed." Rudisill at column 6, lines 6-7. Rudisill at column 6, lines 13-15 discloses: "A further variation to the embodiment in FIG. 3 would be to vary the areal density of pits on the top surface as a function of distance from the edge light."

Rudisill at column 6, lines 19-29 explains that the variation in areal density is accompanied by randomized pitting:

In FIG. 4, the pits 58, in the top surface 60 of the backlight panel, are **random** in depth and wall angles, and are increasing in areal density as a function of distance from the edge light introduced at edge 62 of the panel. The bottom surface 64 of the panel is a flat mirrored surface. The top surface may be **randomly pitted** by molding the surface with crystals used in making sandpaper. Garnet crystals, used in sandpaper, produce a distribution of pit wall angles which are in the proper range for reflecting light rays within the useable viewing angle. (Emphasis added)

Rudisill fails to disclose or suggest the combination of a "cone pattern" with "a density of cones increases as a distance from said lamp increases," as is embodied in claims 1 and 11. The garnet-based manufacturing method of Rudisill will necessarily

produce a random pit distribution with varied pit density. Figures 4a and 4B of the invention, in contrast, indicate the regularity of the inventive cone pattern.

The Examiner additionally admits to Rudisill failing to disclose a light path converter and a diffusion sheet disposed above the light guide plate.

The Examiner then turns to Hiyama for teachings pertaining to a light converter and a diffusion sheet disposed above the light guide.

As a result, the combination of Rudisill and Hiyama fails to either disclose or suggest an embodiment of the invention as is set forth in independent claims 1 and 11. A *prima facie* case of obviousness has thus not been made. Claims dependent upon independent claims 1 and 11 are patentable for at least the above reasons.

This rejection is accordingly overcome and withdrawal thereof is respectfully requested.

Rejection Under 35 U.S.C. §103(a) Over Rudisill, Hiyama and Ohara

Claims 6 and 14 are rejected under 35 U.S.C. §103(a) as being obvious over Rudisill and Hiyama, as applied to claims 1, 3-5, 7,

9-13, 17, 19 and 21, and further in view of Ohara (U. S. Patent 5,844,720). Applicant traverses.

The inability of Rudisill and Hiyama to allege obviousness over claim 1, 11 or their dependent claims has been discussed above. The Examiner turns to Ohara for teachings pertaining to vertical angles. These teachings of Ohara fail to address the deficiencies of Rudisill and Hiyama. As a result, the combination of Rudisill, Hiyama and Ohara fails to allege *prima facie* obviousness over claims 6 and 14.

This rejection is accordingly overcome and withdrawal thereof is respectfully requested.

Rejection Under 35 U.S.C. §103(a) Over Rudisill, Hiyama and Yokoyama

Claims 8, 15 and 16 are rejected under 35 U.S.C. §103(a) as being obvious over Rudisill and Hiyama, as applied to claims 1, 3-5, 7, 9-3, 17, 19 and 21, and further in view of Yokoyama (U. S. Patent 5,899,552). Applicant traverses.

The inability of Rudisill and Hiyama to allege obviousness over claim 1, 11 or their dependent claims has been discussed above. The Examiner turns to Yokoyama for teachings pertaining to a backward prism having a vertical angle. These teachings of

Yokoyama fail to address the deficiencies of Rudisill and Hiyama. As a result, the combination of Rudisill, Hiyama and Yokoyama fails to allege *prima facie* obviousness over claims 8, 15 and 16.

This rejection is accordingly overcome and withdrawal thereof is respectfully requested.

Information Disclosure Statement

Applicant thanks the Examiner for considering the information disclosure statement filed November 8, 2001, and for making the initialed PTO-1449 form of record in the application in the Office Action mailed November 29, 2002.

The Drawings

The Examiner is respectfully requested to indicate whether the drawing figures are acceptable in the next Official Action.

Conclusion

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Robert E. Goozner, Ph.D. (Reg. No. 42,593) at the telephone number of the undersigned below, to conduct an

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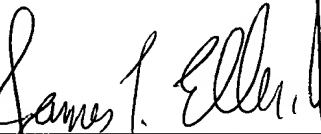
interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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